Strategy Research Project

CLIMATE CHANGE: U.S.-CHINA PARTNERSHIP FOR GLOBAL SECURITY

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USAWC STRATEGY RESEARCH PROJECT

CLIMATE CHANGE: U.S.—CHINA PARTNERSHIP FOR GLOBAL SECURITY

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ABSTRACT

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China has capitalized on economic globalization to emerge as one of the largest industrial nations, and a major producer of greenhouse gases. The primary cause of climate change is the increasing airborne emissions of greenhouse gases. Recent studies provide empirical evidence of anthropologic influences on the rate of climate change. Climate change poses a significant strategic peril to the United States because it threatens the nation's food supply, infrastructure, health, water resources, coastal systems, and ecosystems. Further, it is disrupting global biogeochemical cycles, melting ice sheets, and disturbing oceanic and atmospheric circulation. These changes will likely impact most, if not all, nation—ultimately threatening global stability. Effective diplomacy and profound changes in policy are required to mitigate these risks. One possible recommendation for the United States is to partner with China as allies to adapt to and mitigate the effects of climate change.

CLIMATE CHANGE: U.S.—CHINA PARTNERSHIP FOR GLOBAL SECURITY

> Climate change and our dependence on foreign oil are a threat to our national security. There's nothing conservative about remaining indebted to hostile regimes for our energy. It's time for the Senate to lead and – with an eye toward our best traditions – find common ground to move the country forward, keep our country safe and strong, and lay the groundwork for decades of economic growth to come.
>
> —Senator Barbara Boxer [1]

The United States is capable of wielding constructive global influence by leveraging all the elements of national power (diplomacy, information, military, and economics) to protect its interests. However, in the 21st Century, the United States faces a volatile, complex, and uncertain world—one possibly filled with violence and conflict with state as well as non-state actors. The potential for a strategic surprise of the worst sort, similar to the September 11, 2001 attack on the United States, remains a real possibility. Climate change as an environmental security issue could be a catalyst for future conflicts that deserves an evaluation of ways to mitigate its influences.

The United States and China have a common interest and may be facing a common foe. While China continues to develop economically, it too faces this ubiquitous threat of adverse affects from climate change. The cities of China are heavily polluted from the emissions of green house gasses (GHG). China will continue to rely heavily on carbon based energy sources for its economic and social development needs. However, China recognizes the need to balance economic growth with mitigating climate change impact. In 2007, the government of China created the China's National Climate Change Programme (CNCCP) enabling the creation of goals and objectives, as well as policies and strategies to address climate change concerns.[2] The United States has an opportunity to work cooperatively with China as demonstration of

being responsible global leaders. Certainly, it is better for the United States and China to be economic competitors and not military rivals as both countries continue to cope with climate change challenges. This Strategic Research Paper traces the topic of climate change issues, describes current U.S. policies and countermeasures, and explores a cooperative approach with developing countries, particularly China, to address this national and global strategic problem.

While climate change itself may not be a direct cause for the spread of extremist ideology or terrorism, it may create an environment that renders weak regimes vulnerable to such threats. When government fails to satisfy basic social and economic needs, citizens may question the legitimacy of their government. Shortages of water and food, spread of famine and disease, and the instability of nations due to massive refugees and immigration as a result of climate change—these conditions create an environment for terrorists and insurgents to exploit. Ignoring these environmental security challenges will not make them go away. In fact, these challenges may require the United States to engage in protracted military operations against some extremist groups or to enter into traditional engagements using conventional forces.

Unlike conventional threats posed by a ruthless and corrupt dictator, failed governance, or anti-democratic radical factions, the prospects of climate change causing famine, water shortages, or destabilizing nations is a universal and amorphous threat. Economic and industrial globalization has improved the standard of living for many nations. However, a by-product of dramatic economic development in countries such as China is the increased emission of GHG from burning carbon-based fuels used to bolster new industries in developing nations. In 2007, the United States has 5% of the

world's population but was responsible for more than 20% of the emissions of GHG. In contrast, China has 20% of the world's population, but generated 21% of GHG emissions.[3] With China's burgeoning economy, it recognizes the importance of continue economic growth while minimizing impact to the environment. To remain a responsible global leader in the 21st century, the United States may consider a policy of open engagement and cooperation with all industrial nations, especially China, to minimize the threat posed by global climate change. To address this threat, the United States should consider these strategic issues: 1) China's intent to become a global power, 2) U.S. dependence on foreign oil, and 3) climate change's potential to destabilize nations. Similar to the former Secretary of Defense Perry's defense policy called "Preventive Defense Strategy—prevent, deter, defeat," the United States can embark on practical ways to reduce GHG emissions through legislation and international collaboration that can synergistically reduce risks to U.S. national security. Or, the United States can choose to do nothing and allow consequences of climate change to unfold naturally, and respond to crises as they develop. However, doing nothing may be more costly and riskier than Perry's "shape, prepare, respond" approach.

Climate Change Controversy and Threat to National Security

Scientific evidence affirms that there is anthropologic influence on the changing global climate.[4] A natural equilibrium neutralizes emissions and absorption of GHG like CO_2, by plants, trees, and the oceans. But human burning of fossil fuels (oil, natural gas, and coal) for sources of energy creates an imbalance by releasing unprecedented amounts of CO_2, exceeding the natural capacity to absorb them. Since the 19th century industrial era, humans have been burning fossil fuels to generate electricity, to propel motor vehicles, and to manufacture goods. Fossil fuels literally drive modern

economies. As modernization spreads globally, burning fossil fuels releases more and more CO_2 into the atmosphere. Therefore, the increasing amount of CO_2, as the most emitted anthropogenic GHG, is a major contributor to an unnatural acceleration of warming the atmosphere and earth's surface. Accordingly, the Obama Administration is challenged to develop a policy to reduce fossil fuel consumption that is practical for consumers and affordable for corporations.

According to the Intergovernmental Panel on Climate Change (IPCC), the impact of global warming on planet earth depends on the extent of human adaptation to climate change and the rate of temperature change.[5] Global warming is affecting water, ecosystems, food, coasts, and health. In the extreme case of a 5^{o} Celsius temperature increase within the next century, the regions that will experience the greatest hardship are in the mid-latitudes and semi-arid low latitudes. The region closest to the equator will be most vulnerable to water shortages, to famine due to lack of food sources, and to health issues due to malnutrition and diseases. Major cities will be submerged and coastlines will change as a result of flooding and severe storm damage. The earth's ecosystems will be irrevocably changed; species that are incapable of adapting will become extinct.

Independent of the IPCC reports, Chinese scientists have predicted disturbing changes in certain regions of China in the near future.[6] These predictions include: projections that temperature increases of 1-2^{o} C will be consistent throughout China by 2020 and 2-3^{o} C by 2050; rising sea levels will jeopardize homes, commerce, and other critical infrastructures along the coast; and the glaciers in the Qinghai-Tibetan Plateau and the Tianshan Mountains will continue to retreat at an accelerated rate.

Independently, these changes may not be catastrophic, since the Chinese people are resilient and their government has the wealth to adapt to change, but collectively these events may cause irreparable damage to the people living within these regions, and threaten China's economic growth rate.

Admittedly, the issue of climate change is controversial among politicians and scientific experts. Senator James Inhofe (R-OK) declared that "global warming is the greatest hoax ever perpetrated on the American people."[7] Apposing arguments regarding climate change are not surprising since the scientific community is still collecting and analyzing data to fully comprehend the dimensions of this problem. Findings to date, however, threaten the equities of entrenched political interests, such as the energy companies. One of the fundamentals of scientific experiments is the scientists' ability to design and control the parameters of an experiment along with its variables in order to prove or disprove a theory. Unlike traditional laboratory research, scientists are unable to control global warming, so they depend on desultory and widely dispersed measurements to validate warming trends. The theory of climate change and its impact will remain controversial because the *impacts* of global warming (increased intensity in storms, floods, etc.) are difficult to correlate directly to the causes. In his remarks in the Senate, Senator Inhofe referred to German climate researcher Dr. Hans von Storch's article in the Journal of Science that disputes the reliability of the model used by Michael Mann to predict the heating and cooling cycle for the last 1000 years.[8] Michael Mann's chart is based on correlations of the width of tree growth rings and changes in temperature and humidity. Dr. von Storch claims the model discounts the effects of CO_2 concentration, which has a greater influence on the rate of growth of

trees than temperature, so he questions the validity of Mann's correlations of tree ring width to temperature. As a result, Michael Mann's chart has been removed from the IPCC report. This scientific debate is useful and necessary for reaching consensus not only among leading research scientists, but among politicians as well. It is difficult; however, to ignore the measurements of actual temperature recording instruments. Consider the following chart of progressively rising temperature over a span of several centuries.

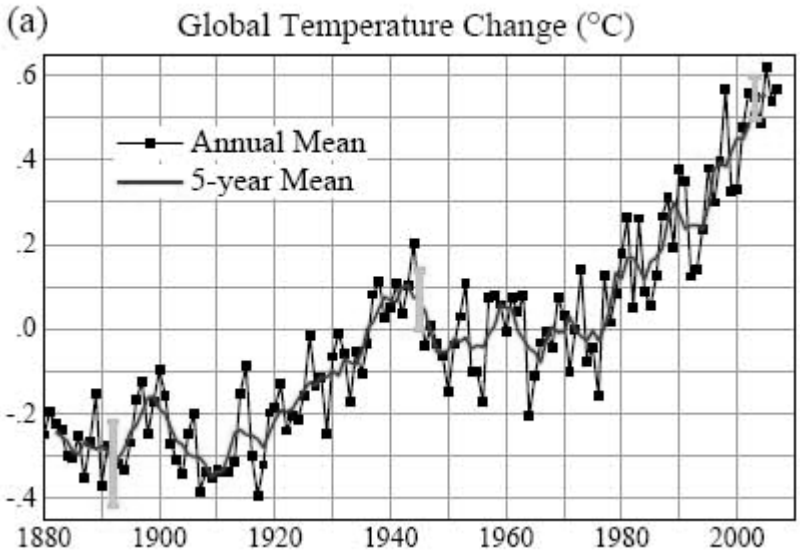

Figure 1: NASA Goddard Institute for Space Studies: Graph of Annual Global Temperature Change. [9]

The single most significant variable that has changed in this period is the introduction of human produced greenhouse gases. Senator Inhofe has every right to be skeptical; a few scientists support his challenge to the climate change theory. As with any controversial scientific topic, it is not difficult to find opponents to argue a given hypothesis. The IPCC report is a collection of five years worth of data gathering, analysis, and reporting by the scientific community, with contributions from thousands of

volunteer scientists around the world. Following the rigors of scientific approaches, scientists should return to this report, and conduct a peer review and re-look the methodology for the collection and analysis of the data. If the goal of the IPCC report is to inform policy-makers of the consequences of climate change, then it must do so in an objective manner without bias towards a political agenda. To better understand the impact and causes of climate change, President Obama can designate the National Science Foundation to work with leading scientists from around the world to re-examine the IPCC report, and to identify future scientific efforts for minimizing uncertainty.

Even when the best climatologists use the most up-to-date scientific methods, it would be nearly impossible to predict the tipping point of irreversible environmental damage. This lack of predictability leads to the question of how many resources should be expended to mitigate the problem. These expenditures should include the countless lives lost on the battlefield. Consider the Afghan Campaign in the global war on terrorism: U.S. $3.6 billion per month, projected to reach a total of $300 billion by 2010.[10] In an environment where the government has failed to provide for its people's basic needs, the Taliban gained control after the United States neglected the region following expulsion of the Soviet forces from Afghanistan. Then the Taliban provided Al-Qaeda with a safe haven from which this terrorist organization plotted the 9/11/2001 attacks on the U.S. homeland. The 9/11 Commission Report notes, "Backward economic policies and repressive political regimes slip into societies that are without hope, where ambition and national passions have no constructive outlet."[11] Dr. Butts of the U.S. Army War College, in his analysis of conditions of terrorism, advises that "Addressing the developmental needs of fragile states, particularly those with large,

illiterate Muslim populations, is an effective way for the United States to deny sanctuary, recruits, and financing to terrorist organizations."[12]

In 2007, Center for Naval Analysis (CNA), a non-profit organization, convened a panel of a dozen of the most respected retired admirals, general officers, and national security experts to conduct an assessment of the national security implications of climate change. Despite their lack of agreement on the extent of future changes, the panel solidly agreed that:

> The potential consequences of climate change are so significant that the prudent course of action is to begin now to assess how these changes may potentially affect our national security, and what courses of action, if any, our nation should take.[13]

This panel concluded that climate change poses a serious threat to America's national security. Climate change will weaken the legitimacy of a struggling government, leaving it vulnerable to extremist groups. General Gordon Sullivan, former Chief of Staff U.S. Army, warned "We seem to be standing by and, frankly, asking for perfectness in science. We never have 100 percent certainty. We never have it. If you wait until you have 100 percent certainty, something bad is going to happen on the battlefield."[14] Climate change alone may not be a security risk to the global environment. But—along with population growth and increasing competition for finite energy sources and water—it will contribute significantly to global instability.

According to the United Nations, the world population is expected to grow from the current 6.5 billion to 9.1 billion by 2050.[15] As population increases, demands for energy will increase. As more energy is produced, GHG gas emission will increase accordingly. Collectively, these changes will most likely exacerbate the effects of climate change. These pressures may destabilize productive nations and push already

fragile countries into a status of failed or failing states. An increasing number of failed or failing states may lead to regional security risks as these troubled states draw others into conflict over dwindling resources. Without stable governance, these failed countries may create an environment hospitable to anti-democracy radical factions that pose international security risks.

Consider India, which is currently a stable nuclear nation with the world's fourth largest economy—behind only the United States, China, and Japan. Recognizing the growing threat of climate change to its national security, India has issued an Indian Climate Policy Paper, which declares that:

- Climate change would intensify interstate and intrastate competition over natural resources, making resource conflicts more likely.
- Higher frequency of extreme weather events (such as hurricanes, flooding, and drought) and a rise in ocean levels are likely to spur greater interstate and intrastate migration – especially of the poor and the vulnerable – from the delta and coastal regions to the hinterlands.
- Human security will be the main casualty as climate change delivers a major blow to vulnerable economic sectors.[16]

Unaddressed, these problems may weaken or destabilize the Indian government, which would then destabilize the region. Not only can this be dangerous to the region in view of Indian on-going conflict with Pakistan. India is but one example of the widespread impact that global warming will have on virtually every nation. Its impact on human life, world trade and economies, and the security and stability of all nations is difficult to predict and frightening to imagine.

The rapid melting of the Himalayan Glaciers provides another example of the perils of climate change. While controversy continues with the IPCC's reporting of the melting of the Himalayan Glaciers, Yao Tandong, head of China's Institute of Tibetan Plateau Research, reported that by the end of the century up to 70% of the mountain range's glaciers could disappear.[17] The predictions are based on research data gathered on the Chinese side of the Himalayas. The snowfall that creates the glaciers along the ridges of the Himalayan Range is a water source for the following rivers: the Ganges, the Indus, the Brahmaputra, the Mekong, the Yellow, and the Yangtze.[18] Together they sustain the lives of nearly 3 billion people in this Southwest Asian region—in People's Republic of China (PRC), India, and Pakistan. Changes within this region due to climate change have already made life progressively more difficult for its inhabitants. Over the past 25 years, the temperatures in Leh, India, situated at 11,500 feet above sea level, have risen by 1^{o} C. Also, Leh has measured less snowfall. As the glaciers continue to melt without additional precipitation, the people that rely on this water source for agriculture and livestock have already started to endure hardships. Competition for water may add to the tensions already festering among China, India, and Pakistan. These tensions may culminate in armed conflicts aggravated by water shortages.

Without cooperation among all industrial nations, changes in temperature across the globe will have devastating effects on several continents. The widespread effects from rising temperatures across the globe are going to directly and indirectly influence U.S. national security—and the American way of life. As China emerges as a leader on the world stage, both economically and as a major emitter of GHG, it is strategically

essential to understand that nation's capabilities and to encourage its willingness to work as partners to address this common threat.

China's Increasing Economic Power: A Security Threat to the United States?

In his 1997 speech to the Fifteenth Party Congress of the PRC, Jian Zemmin set the stage for China to embrace economic globalization and rapidly expand its economy:

> Opening to the outside world is a long-term basic state policy. Confronted with globalization trends in economic, scientific, and technological development, we should take an even more active stance in the world by improving the pattern of opening up in all directions, at all levels and in a wide range, developing an open economy, enhancing our international competitiveness, optimizing our economic structure and improving the quality of our national economy.[19]

China's political, social, and economic transformation is undeniable. In 2001, China's admittance to the World Trade Organization validated its economic transition from an autocratic nation to one that is now integrated into the global economy. Chinese economists' and policy-makers' deliberate decision to move from protectionism to reaping the benefits of economic globalization has resulted in significant gains to the Chinese economy and to its people. Some evidence of these benefits from economic growth are: a rise of the middle class with annual savings equal to 20% of Gross Domestic Product (GDP)[20], a four-fold GDP expansion from $1 trillion in 1998 to $4.3 trillion in 2008[21], and a doubling of direct foreign investment in best practice technology from roughly $40 billion in 2001 to $84 billion per year in 2007.[22]

With this economic growth, China is now in a position to invest more of its annual budget towards the nation's military, the People's Liberation Army (PLA). China's defense budget has grown from U.S. $14.6 billion in 2000 to $30 billion in 2008.[23] As long as its economy continues to flourish, China will continue to modernize its military capabilities with procurement of foreign military weapons and equipment, and

domestically produced weapons.[24] This quadrupling of defense spending should not be a surprise to the United States, since the combination of trade, industrial diversification, and economic prosperity contributes to military power and a more robust defense economy. This concept of national security was explored by Alexander Hamilton in 1791: As a Secretary of Treasury, Hamilton reminded the nation that "promoting [manufacturing]…will tend to render the United States independent of foreign nations for military and other essential supplies."[25] It would appear that Chinese leaders are heeding Hamilton's counsel: China is fulfilling its national interests by providing security for the country as well as economic prosperity for the people, while maintaining the central government's power. The true concern for the United States is the correlation between the improvements in China's national economy and its investments in defense—either to defend its borders or to expand its influence in order to exercise the prerogatives of a superpower as a regional hegemon.

A direct comparison of the United States and PRC military spending is revealing: The United States spent nearly $500 billion in 2008 and $516 billion in 2009 for Department of Defense base budget.[26] These numbers seem to dwarf the PRC's national defense spending by nearly ten-fold. But in comparison of ratios of defense spending and gross domestic product (GDP), China ranks 25th worldwide in 2006 at 4.3%, while the United States ranks 28th at 4.06%.[27] China's total military service members in the PLA exceed that of the United States. According to the latest estimates of global security.org, the PLA currently has 2.3 million serving members while the United States has 1.5 million military service members. Even though China enjoys numerical superiority, the U.S. military is currently more capable because of its

leadership, training, and modern technologies. However, as the PLA's capabilities in technologies and manpower continue to develop, they may be able to directly challenge the U.S. military in future conflicts.

China's history reveals a complex relationship with its neighbors. Also, China supported U.S. adversaries during the Cold War era. Since 1949, China has been involved in regional armed conflicts with most of its neighbors: Vietnam, Korea, Russia, and India. During U.S. engagements in the Vietnam and Korean conflicts, China countered U.S. efforts by providing arms to opposing forces. Despite China's larger military force, the Chinese government has chosen not to directly engage the United States in a military conflict. Instead, the PLC has built an asymmetric capacity to counteract the United States overwhelming military strength. Even though the Cold War has ended, U.S.-Chinese tensions have persisted.

Today, the U.S. military is engaged in counterterrorism and counterinsurgency military operations on the Southwest border of Afghanistan. This situation has been complicated by tensions over the Kashmir region between the nuclear-capable nations of Pakistan and India. Further tensions between Iran and the United States persist due to Iran's quest to acquire nuclear weapons and antagonism towards Israel. To the Southeast is Taiwan's security problem: Taiwan's leaders seek sovereignty despite PRC's claim that Taiwan is a legitimate part of China. If China decides to incorporate Taiwan, then the United States may not have many options other than military intervention. However, China will not expend precious resources to incorporate Taiwan if the gains are not significant or if the effort is too costly. As long as the United States maintains its policy of defending Taiwan, the conflict may be forestalled—but not without

potential escalation of tensions. As China continues to develop economically, its reliance on fossil fuel from the Middle East depends on a stable shipping lane in the South China Sea.

Given the complexity of China's security, it would be surprising if China did not take steps to ensure its security and expand its influence using a combination of diplomacy and military actions. While China's economic growth has enabled it to expand its military capability, it too faces the common universal problem of climate change. Now is the time for the United States to develop a specific strategy to cooperate with China to address climate change and jointly lead the world in enacting global policy to address a global security threat.

Recommendations to Mitigate the Risks to U.S. National Security as a Result of Climate Change

In 1990, the United Nations Framework Convention (UNFC) began to discuss the need to limit the levels of greenhouse gases in the atmosphere as a means of reversing the impact of global warming. Since then, 184 countries have adopted the Kyoto Protocol, which commits the international community to mandate the reduction of their GHG emissions. In 2007, the United States accounted for 20% of the world's CO_2 emissions, which is the second most of all developed nations. Yet the United States is not a signatory member of the Kyoto Protocol. One U.S. criticism of the Kyoto protocol is the economic disparity caused by exemptions for developing countries such as China and India. But China, a signatory of the Kyoto Protocol, has acknowledged the implications of climate change as a direct result of GHG emissions and has offered to work with the U.S. to address this problem. China has promulgated policies and strategies within the CNCCP to mitigate the concerns of climate change by leveraging

technology and institutional reform to address the energy consuming sectors.[28] Both countries recognize the need for innovative solutions to reduce GHG without placing financial burdens on their industries. The international community recently met in December 2009 in Copenhagen to discuss climate change and to agree upon means to reduce GHG emissions. China and the United States have a significant role as leaders in this effort.

With unprecedented growth, China is facing new health and mitigation challenges because its burgeoning manufacturing industry is emitting more pollutants. China is using both forms of carbon-based fuels, oil and coal, to sustain its economic engine. Coal accounts for about 70% of China's total energy consumption. China continues to increase its consumption of crude oil. Both of these carbon-based fuels are primary producers of CO_2, a GHG responsible for global climate change. By working with China on research and development for alternative energy sources consistent with the CNCCP strategies, the U.S. and China can lead the way in managing this problem.

On 27-28 July 2009, Secretary of State Hillary Rodham Clinton and Secretary of the Treasury Timothy F. Geithner, as special representatives of President Barack Obama, engaged in a discussion with Chinese representatives on strategic and economic topics. They indicated the desirability of U.S.-Chinese cooperation on global climate change. Led by the DOS and DOE in the United States and the National Development and Reform Commission in China, the two sides negotiated a Memorandum of Understanding (MOU) to Enhance Cooperation on Climate Change, Energy and the Environment. The fundamental principles of this MOU are consistent

with the CNCCP's strategies. The MOU establishes a road map for formulating a bi-lateral climate change policy and for promoting cooperation in the following areas:

- Discussion and exchange of views on domestic strategies and policies for addressing climate change
- Practical solutions for promoting the transition to low-carbon economies
- Successful international negotiations on climate change
- Joint research, development, deployment, and transfer of climate-friendly technologies
- Cooperation on specific projects
- Adaptation to climate change
- Capacity building and raising public awareness
- Pragmatic cooperation on climate change among cities, universities, provinces and states of the two countries. [29]

In 2007, as evidence of China's growing economy, China overtook the United States to become the world's largest emitter of CO_2 gas from fuel combustion. The agreement between the United States and China to exchange relevant information in a mutual effort to reduce GHG emissions is *critical* since the countries are economically dependent upon one another. Any recommendations to curtail GHG emissions will have an impact on both economies. This MOU is a critical first step. The two leading emitters must maintain the momentum, in spite of the numerous challenges both countries are facing. Cooperation on this issue builds trust. Not only is this collaboration necessary for promoting joint ventures in technology research, but it is also critical for dealing with future political challenges, such as issues related to failing nations as a consequence of

climate change. But in order to effectively address the issues of climate change, the United States must first act responsibly at home by passing the Boxer-Kerry bill, by creating incentives for industries to voluntarily reduce emissions, and by launching a whole-of-government effort to solve the problem. To continue as the beacon of economic and political freedom in the world, America must start with reform on our own soil. U.S. willingness to clean its own house sends a strong message of the urgency of the global problem while promoting further cooperation beyond the MOU with China.

The Obama Administration needs to boldly assume global leadership on environmental issues. This administration is wisely seeking to make the nation less dependent on foreign energy. At the Copenhagen conference, President Barack Obama vowed to the international community that America will follow through on the Administration's clean energy agenda. A sound U.S. strategy and policy for dealing with climate change by promoting research and development in renewable fuel sources and for reduction of GHG emissions is essential. The Administration has specified that it will address energy and environment as one of 23 identified national strategic issues. It will deal with climate change in three ways—by investing in jobs that produce clean energy, by securing our energy future, and by closing the carbon loophole and punishing polluters.[30] In addition, the Administration needs to consider working with China as a partner in a joint effort to lead the rest of the world in identifying solutions to climate change issues.

The Clean Energy Jobs and American Power Act sponsored by Senators Boxer (D-CA) and Kerry (D-MASS) is currently stalled in Congress. President Obama's endorsement will assist with passing of this bill by signaling a sense of urgency to a

growing security risk. The goal of this legislation is to reduce pollution and limit global climate change while stimulating the economy through job creation. If passed, this legislation will create incentives for industries to find innovative solutions for developing renewable energy sources and for enabling the largest carbon polluters to reduce emissions. However, a major impediment to this legislation is its endorsement of the cap-and-trade concept. Opponents of the Boxer-Kerry legislation argue that the capping to U.S. companies' emissions will create economic hardships for private U.S. industries that are competing in a global market. However, the cap-and-trade concept is sound, but it must be equitably applied. It should be applied across the globe as a future United Nation initiative.

In addition to this bill, embedded within the American Recovery Act is $80 billion dedicated to investments in clean energy. President Obama has designated Carol Martha Browner to head the White House Office of Energy and Climate Change Policy.[31] This newly created government agency is responsible for coordinating the administration's policy on energy and climate change. Other agencies such as the Department of Energy (DOE), Environmental Protection Agency (EPA) and the Department of State (DOS) are also executing the administration's policy on climate change. Agencies such as DOE and EPA that have core competencies in science and technology are working to reduce the level of GHG emissions through innovative research and collaboration with industries to promote voluntary reporting and reduction of CO_2 emissions. These agencies are also developing regulations and increasing consumer interest in and awareness of climate change.

The federal government must take steps to mandate the use of renewable energy sources. Strategic objectives are achievable through investments in technological innovation and through modifying lifestyle behavior through education—and incentivizing corporations to reduce GHG emissions. To rally support for climate change policy, the government needs to inform the public through the media, internet, and current mainstream technology (e.g. blogs, facebook & twitter) on the impacts of fossil fuel consumption and on alternatives. Historically, U.S. government policy is more successful if it enjoys strong support, particularly when the policy requires a change in the people's behavior—such as a public campaign against drunk driving. But in a world of technological innovation, a user-friendly Web Page or free software can inform average citizens on how to make an impact. An interactive model can show how to reduce GHG by individual actions such as lowering thermostat settings, adding insulation, or taking actions to conserve household energy. Homeowners should receive a proportionate annual tax credit to incentivize behavioral changes that result in a reduction of GHG emissions based on the interactive model. To further incentivize change, a progressive federal tax should be added to gasoline prices over a period of several years. This additional revenue can then be used to advance technological solutions through grants and open competition for aftermarket fuel-saving devices. These grants should be open to national as well as international competition. The most promising technological innovation will come from scientific exchanges among U.S., Chinese, and other international students and scientists.

After 9/11, U.S. immigration laws were tightened to protect the nation from illegal entry by terrorists. An unintended consequence of tightening immigration has been a

reduction in the number of visas given to eligible foreign graduate students. Consider the 30% drop in student visas issued from 2001 through 2005.[32] In 2008, the number of visas issued is nearing the 2001 levels. To attract the best talent from China and the other industrialized countries like Japan and India, the United States needs to review its immigration procedures and standards to allow talented international students to earn advanced degrees in science. Encouraging this convergence of minds and talents will energize scientific research and enhance development of alternative fuel sources. Incentives in the forms of grants and loans should be made available to companies that successfully convert academic research into useful energy-saving products.

At the national level, the issue of climate change and reduction of GHG has broad diplomatic, economic, environmental, and energy implications. Accordingly, it is logical to delegate the execution of the Administration's energy and environmental policy to the Department of State, Department of Treasury, Environmental Protection Agency, and Department of Energy. However, given the difference of personalities, organizational culture, and interests among these federal agencies, it may be difficult for cooperation and effectiveness among these groups. An alternate proposal is to assign dedicated individuals from the four principle agencies to work directly under the White House Office of Energy and Climate Change Policy. This group should be the proponent for the Administration's clean energy agenda with budget authority. As previously noted, China and the United States are key players in the global warming solution, so their governmental actions should be performed in tandem to sustain the partnership and to encourage more international cooperation.

The individuals working within this agency must have cross-functional skills: they should know the science and understand cultural differences between the United States and China. Cooperation between the two countries requires mirror-image offices operating within the United States and abroad in China with two-year rotational assignments. Participants will be responsible for working with the private sector, academia, and the government to reduce GHG emissions. Further, the government can incentivize industries through tax credits to share proven technologies to reduce CO_2 emissions with companies in both countries. These leading technologies should also be shared with other countries seeking to reduce their carbon footprints.

Acknowledging the energy challenge and its implications as a security threat, Navy Secretary Ray Mabus has taken the lead on moving the Navy towards the use of renewable energy supplies.[33] His strategy to support President Obama's policy of becoming less dependent on foreign energy includes the goal of transitioning the Navy's "strike group" from fossil fuels to renewable fuel sources, such as nuclear or biofuels, by 2016. Within a decade, Secretary Mabus would like to see half of the Navy's total energy consumption come from renewable energy sources. Congress should encourage this initiative by passing legislation directing all services to adopt similar ambitious goals by mandating all military technologies to double current mileage within the next decade, and to use renewable energy fuels in major weapon systems. To further the goal of reducing the U.S. government's reliance on fossil fuels, all future contracts on leased government vehicles should phase in the use of hybrid automobiles. This will incentivize the automotive industry to invest in the development and manufacturing of hybrid technologies while satisfying the corporate goal to generate

profits. Mass production of hybrid vehicles will make them more affordable, trickling savings down to the average consumer. To date, hybrid vehicles using alternative power sources are not cost-competitive for most consumers. With reduced manufacturing costs from economies of scale, hybrid vehicles will be as cost-competitive as traditional vehicles, thereby making alternative fuel vehicles more appealing to consumers while reducing the carbon footprint.

At the global level, once the partnership between the U.S. and China is effective, the United States can expand the MOU to other strategic partners: India, Japan, and European nations. As a leader in innovation, U.S. cooperation with all industrial nations will enhance economic prosperity while advancing national security. If we change our approach from unilateralism to multilateralism in order to support other nations' interests, then we will emerge as a nation perceived to be a contributing member to global interests. As we become less dependent on foreign sources of fossil fuel while sustaining our economic power, we can focus our national budget on other priorities, such as social programs and reducing the deficit. The ultimate goal is to find a replacement fuel source that permanently reduces our reliance on fossil fuel and coal while providing the same energy output to our industries and homes as we reduce our carbon emissions.

The United States needs to participate more actively in the Green Economy Initiative (GEI) led by the United Nations Environment Programme (UNEP). [34] This initiative is designed to address the financial and economic crisis while tackling the issues of climate change, environmental degradation, and poverty.[35] In 2009, the Global Green New Deal initiative was launched during the G20 summit in Pittsburgh, PA. This

proposal recommends that a portion of the fiscal stimulus package from the seven G20 countries of China, France, Germany, the United States, Mexico, Republic of Korea, and South Africa be invested into five critical areas: 1) energy efficiency in old and new buildings; 2) renewable energy technologies, such as wind power, geothermal and biomass technologies; 3) sustainable transport technologies, such as hybrid vehicles, high-speed rail and bus rapid transit systems; 4) the planet's ecological infrastructure, including freshwaters, forests, soils, and coral reefs; and 5) sustainable agriculture, including organic production.[36] The GEI seeks to promote sustainable economic sectors in the G20 countries. The proposal recommends investing one-third (U.S. $750 billion) of the U.S. $2.5 trillion stimulus package in the five cited critical sectors. This investment amounts to about 1% of the global GDP. The return on this investment would be a concurrent reduction in the levels of GHG emissions and the creation of millions of jobs worldwide.

A recent report by the UNEP revealed a disparity in the contributions among the seven G20 countries. According to HSBC figures, the Republic of Korea's green investment represents 79% of its overall stimulus package, followed by China's 34%; France's 18%; Germany's 13%; the United States' 12%; South Africa's 11%; and Mexico's 10%—a total investment of roughly U.S. $400 billion.[37] The investment amounts to only half of the recommended U.S. $750 billion. The actions of the G20 countries reveal a lack of unity of effort: more can be done to unite the nations to address this looming threat. As the two leading GHG producers, the United States and China, must work cooperatively to develop coherent policy, sound strategy, and productive teamwork to meet the UNEP goals.

More U.S.-Chinese cooperation may exert greater pressure on the other G20 nations to contribute fully 1% of the globe's GDP. In 2009, the United States contributed 0.8% of its GDP to the green programs and ranked 4th out of 13 G20 countries. The Republic of Korea, China and Australia contributed 7%, 5%, and 0.9% of its GDP, respectively. Failing to contribute generously to these stimulus funds, we are not in a position to persuade others to contribute more. In addition, with China spending more of its stimulus package on green economy projects, it is investing in a more rapid recovery of the Chinese economy and creation of jobs. The benefit of active U.S. engagement with China would be an accelerated economic recovery, since our economies are directly linked through imports and exports. A joint effort will also send a message to the rest of the G20 nations on the importance of climate change and its impact to global security.

The U.S. approach for cooperating with China must be methodical and prudent in order to succeed. To work with China we should respect their sovereignty; as such, we may have to overlook some Chinese human rights abuses. One approach to foster cooperation and partnership is to work as equals to achieve the greater common goal of protecting national interests and security. China seeks respect as it continues to play a larger role on the international stage. So we must not give the appearance of a dominant power dictating a policy that is belied by our actions. If the developed and developing countries fail to work towards a common purpose, nations will fail as a direct result of climate change. These failing states may create an environment for terrorists that are determined to disrupt global economic growth. We all become vulnerable to disruptions from terrorist attacks. The people of China must also be convinced of the

existential threat of climate change. They must understand its threat to their health and their way of life, as well as risks to their neighbors to the Southeast. When they are fully aware of the implications of climate change, they will be more inclined to support their leaders' cooperation with the United States to counter this existential threat.

We must acknowledge the disparity between the current political structures of the United States and China. China will cooperate as long as the mutual efforts benefit the ruling government. If the leaders of this one-party state fear that cooperation with the United States weakens their hold on power, they will be reluctant to collaborate. To strengthen this delicate relationship, the United States should constantly monitor the domestic and international political implications of U.S.-Chinese cooperation. We must allow China's political reform to develop internally without the appearance of meddling. China has already taken a step towards capitalism by expanding its industry and by allowing foreign investments in their expansion. The next logical step in China's transformation is to provide a better standard of living for its rising middle class. The rise of this middle class and their quest for a better life may reach a tipping point that triggers further reform of the PRC government.

But, we must not expect this reform to happen overnight. Nor should we expect it to produce a flourishing Asian democracy. China has emerged as a global power and for the most part has acted responsibly within the international arena. Whether or not this rise to global power was calculated and planned by recent Chinese rulers—Hu Jintao, Jiang Zemin, Deng Xiaoping, and Mao Zedon—is unknown. We do not know China's ultimate intentions. But given the uncertainty of climate change and its adverse impact, the time has come to establish a policy of cooperation and partnership with

China. Above all else, we must have a greater sensitivity toward their culture while promoting better understanding of one another, based on mutual respect and an equal partnership.

Conclusion

In summary, the United States can choose whether or not to engage China as a partner to deal with the issue of climate change and its impact. To reduce the possibilities of future conflicts between the United States and China, we should use the challenges of climate change to build a partnership based on mutual respect and common interests to bring about positive global change. If the United States wants to avoid an insecure and unstable future, then one of its best security options is to invest more in green energy projects and to work cooperatively with other economic powers to reduce GHG emissions. We live in a world that links its entire people through economic globalization. We are currently experiencing a global economic crisis; global population is growing; the climate is unnaturally changing; the global security environment is more uncertain then ever. As a global power, the United States has been a leader in providing security for many nations while they develop their economies. The issues of famine, environmental degradation, human suffering, and poverty as a result of climate change may exceed U.S. capabilities if they are not addressed immediately through bilateral or multilateral fora. To do so, we need to move beyond a world of divided and competitive nations. We must acknowledge the linkages and interdependency of all nations while aggressively pursuing renewable energy sources and technologies within our own nation. We must exercise greater political leadership to foster greater international cooperation to deal with the greatest threat to mankind—climate change. If the United States and China stand together to meet this challenge, the world will follow.

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